

Lubbock Outer Route Feasibility Study Report *Executive Summary*



Prepared for:

Texas Department of Transportation
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Executive Summary

Editor's Note: The Executive Summary is an abridged version of the Feasibility Study Report. It is for the reader with limited time interested mainly in the results and the decision making process. With that in mind, the Executive Summary is heavily slanted toward methodology, analysis, conclusions, and recommendations. It is suggested that a reader interested in a more comprehensive understanding of the feasibility of a Lubbock Outer Route read the entire Final Feasibility Study Report.

Introduction

In response to the expansion of development and projected future traffic growth in western and southern Lubbock County, the Texas Department of Transportation (TxDOT) initiated a transportation planning study. This overall study was developed initially with a feasibility study to be completed as Phase 1 and subsequent route study, if required, to be completed as Phase 2. This study was developed with a National Environmental Policy Act (NEPA) compliant process that supported local transportation goals and ensured consistency with TxDOT statewide goals. This Executive Summary documents the Feasibility Study and its results.

The purpose of the Feasibility Study was to determine the feasibility of an Outer Route around the City of Lubbock from US 84 northwest of Lubbock to US 84 southeast of Lubbock. Additionally, the Feasibility Study would provide alternative corridors. If an Outer Route was determined to be feasible, then it was proposed that a route study would be initiated. The Route Study would further investigate and refine the alternative corridors, and would identify the preferred alternative route.

Through the feasibility study process, alternatives corridors and a preferred viable alternative corridor were identified. A facility type, along with a phasing concept and implementation plan, was also identified. The results of this Feasibility Study provide a major first step in preserving a future transportation corridor in Lubbock County that will minimize impacts to the human and natural environment, as well as, minimize costs associated with the development of a future transportation facility.

Project Approach

The development of corridor alternatives for the Lubbock Outer Route was undertaken using a stepwise approach. An initial study area (Figure ES.1) was established based on the parameters further detailed in the Need and Purpose section of this report. This study area encompassed approximately 200 square miles of Lubbock County. Section limits were initially developed to provide reasonable boundaries of analysis between logical end points. For clarity in gathering, analysis, and reporting of information, the study area was broken into five segments labeled A, B, C, D, or E on the figure:

- **Section A** – From the northwestern terminus at U.S. 84 south to S.H. 114.
- **Section B** – From S.H. 114 south to U.S. 62/82.
- **Section C** – From U.S. 62/82 south and east to F.M. 1730 (Slide Road).
- **Section D** – From F.M. 1730 (Slide Road) east to U.S. 87
- **Section E** – From U.S. 87 east to the southeastern terminus at U.S 84.

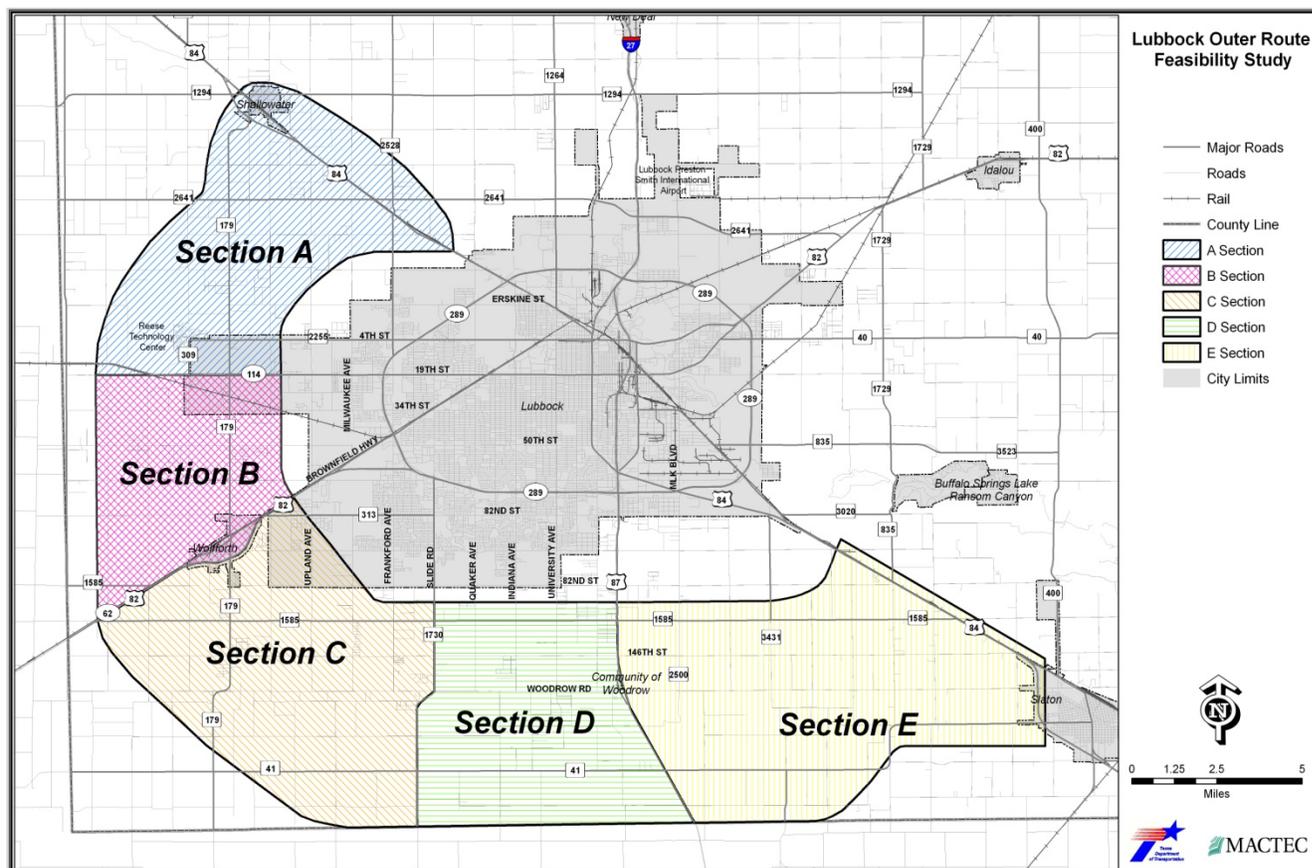


Figure ES.1: Study Area

The development of corridor alternatives for the Lubbock Outer Route was undertaken using a stepwise interdisciplinary approach and "fatal flaw analysis". Constraints, or limitations to corridor development, were mapped to assist in the development of initial half-mile wide preliminary alternative corridors. Environmental and engineering information was used in the development of alternatives and in the analysis of potential environmental impacts. This information was developed by acquiring and consolidating information from a variety of sources including public involvement meetings, file information from the Texas Department of Transportation (TxDOT), other state agencies, the City of Lubbock, the City of Wolforth, Lubbock County, the Lubbock MPO, public input, and field reconnaissance. As a result of extensive review of available information, a number of key environmental and engineering issues were identified and considered in alternative development and selection of the Preferred Corridor:

- **Traffic, Access and Safety Issues:** The Lubbock Outer Route will provide service to future growth in traffic within the study area by improving movement and circulation and relieving congested roadways. Improvement in access and relief of congestion will also enhance safety on the existing roadway network.
- **Engineering Issues:** Engineering elements that posed a challenge to the development of a future transportation facility in the study area were identified. An example was the location of potential major interchanges at the termini with US 84 in close proximity to the BNSF railroad. The flat terrain and the lack of natural waterways in the region additionally present unique drainage issues.
- **Social and Economic Conditions:** Existing and proposed residential and business developments were identified within the project area. The communities within the study area and served by the proposed Lubbock Outer Route have demonstrated rapid (albeit sometimes sporadic) development and are projected to continue their expansion in the future. In many areas, agricultural lands are undergoing rapid conversion to residential development. Given the rapid rate of development in the region, this information will require updating over the course of the route study as new residential subdivisions are identified in previously undeveloped areas. Such developments should continue to be monitored during the route study to avoid displacement effects, access issues and noise-related impacts.
- **Agricultural Impacts:** Agricultural land uses represent the greatest type of land use affected by the Lubbock Outer Route. Rapid development in many areas of the corridor is observed to be contributing to the conversion of agricultural lands to residential use. Strong consideration was given to avoiding and minimizing impacts to prime and unique farmlands, farm operations, and centennial farms throughout the alternative development phase of the project.
- **Rare, Threatened, or Endangered Species:** Federal and state listed threatened or endangered species potentially occurring in the region include the Whooping Crane (federally endangered, FE), American Peregrine Falcon (state threatened, ST), Bald Eagle (state threatened, ST), and Texas horned lizard (state threatened, ST). These factors will be further evaluated in the Route Study.
- **Cultural Resources:** Generally, the project area is sparse in recorded sites. According to the THC's online sites Atlas, accessed on April 3, 2010, there are only two previously recorded archeological sites within the proposed corridor alternatives. Neither of the sites was recommended for inclusion in the National Register of Historic Places (NHRP) or for formal designation as a State Archeological Landmark (SAL). No impacts are anticipated to occur to identified cemeteries or NRHP-listed sites.
- **Floodways/Floodplains:** The study area crosses several floodplains, most of which are associated with playa lakes. In addition, the study area crosses the floodplain for Yellow House Draw.

Consideration of these various constraints resulted in the development of three preliminary 0.5 mile wide alternative corridors as presented in Figure ES.2. These corridors will be further refined and narrowed in the Route Study. The alternative corridors were evaluated in detail to identify a single, Preferred Corridor that would form the basis of the primary preserved corridor.

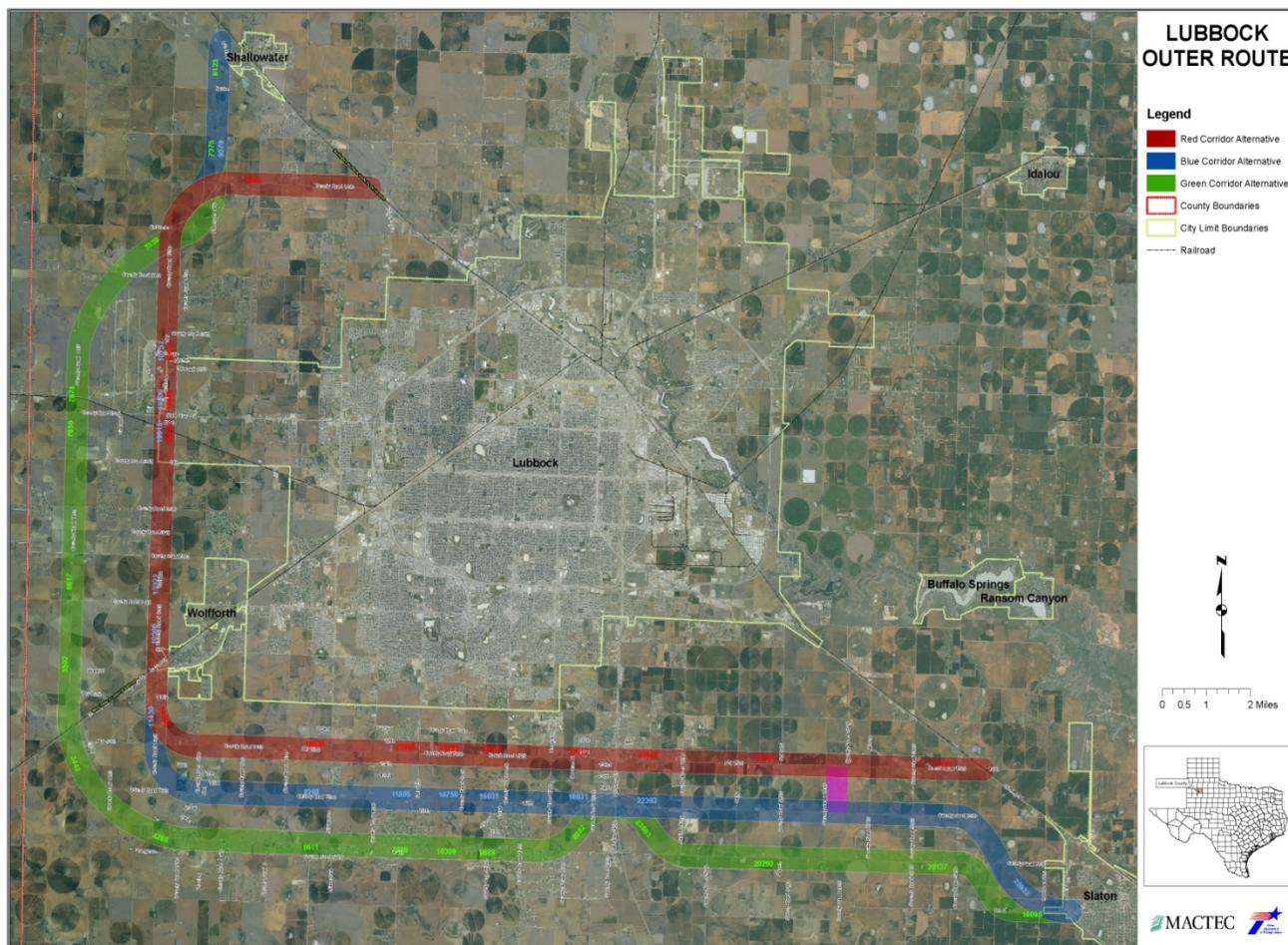


Figure ES.2: Corridor Alternatives

The purpose and need for this study identified that the proposed facility type should be functionally classified as a major arterial. Therefore, we focused on multi-lane facility options. Four basic types of multi-lane facilities fit the criteria identified in the Need and Purpose and are shown as follows:

- Freeway
- Urban Arterial Thoroughfare
- Four-Lane Divided Highway
- Interim Freeway

A comparison of the general design criteria of each of these facility types are shown below in Table ES-1.

Table ES-1. Design Criteria Comparison of Facility Types

FACILITY TYPE COMPARISON				
	4-LANE DIVIDED FREEWAY	6-LANE ARTERIAL THOROUGHFARE	4-LANE DIVIDED RURAL HIGHWAY	4- LANE DIVIDED INTERIM FREEWAY
AVERAGE ROW WIDTH	400	120	180	400
ESTIMATED CONSTRUCTION COST *	\$20.5	\$4.4	\$4.3	\$4.3
ACCESS CONTROL	YES	NO	NO	NO
EXPANDABILITY	YES	NO	NO	YES
TRAFFIC CAPACITY ** (vpd)	45,000-55,000	25,000-30,000	18,000-25,000	18,000-25,000

* Million Dollars Per Mile

** These are general traffic capacities for comparison purposes only. Actual capacities would be based on a number of operational factors.

Traffic Analysis

The objective of the travel demand forecasting for the Lubbock Outer Route Analysis was to develop future roadway scenarios to be used in development of a feasibility study. This was accomplished through a series of alternative analysis model runs implementing the various roadway changes supplied by TxDOT.

The study was focused on the development of six alternatives. These six alternative scenarios were developed by evaluating the three alignments, shown in Figure ES-2, at projected years 2030 and 2050.

A 24-hour distribution model was run for each alternative and the resultant 2030, 24-hour trip matrix was applied to the six alternative analysis networks in the assignment model. To provide a base case for comparison purposes, statistics on a no-build alternative based on the 2030 network were also defined and calculated.

The model output of each individual scenario was compared to the No-Build alternative to represent the positive and negative effects on Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), Total Delay (Hours), Speed (Average Speed), VC (volume-to-capacity), Link Delay (Congested Time minus Free Flow Time) and Cost of Delay (Dollars) of each alternative on the roadway system.

Table ES-2 is a comparison table used to rank the alternatives based on the calculated model outputs. Based on this comparison of the alternatives to the No-Build model measures, the table indicated the Red Freeway corridor clearly provided the most benefit among the seven alternatives. However, the No-Build scenario does rank better than the Green Freeway corridor, and better than the Blue and Green 4-Lane Divided corridors.

Table ES-2. Project Ranking Inclusive of No-Build

Scenario	VMT Rank	VHT Rank	Total Delay Rank	Speed Rank	VC Rank	Link Delay Rank	Cost Rank	Total	Final Rank
Red Freeway	4	1	1	1	3	2	1	13	1
Blue Freeway	5	2	4	2	2	1	4	20	2
Red 4 Lane Divided	2	3	3	4	6	6	3	27	3
No-Build	1	4	2	6	7	7	2	29	4
Green Freeway	7	6	6	3	1	3	6	32	5
Blue 4 Lane Divided	3	5	5	5	5	5	5	33	6
Green 4 Lane Divided	6	7	7	7	4	4	7	42	7

Although the Red corridor provides the most benefit, the traffic volumes on the Red Freeway do not support a freeway facility. In order to determine if a freeway facility would ever be required, a 2050 assignment was created on the Red corridor. The 2050 traffic volumes proved to marginally support a freeway facility.

Economic Impact Analysis

The economic impact analysis for the Red, Green, and Blue corridor alternatives was performed using the State Highway Research Program-2's (SHRP) Transportation Project Impact Case Studies (T-PICS) suite of analysis resources. The SHRP Economic impact analysis tool was applied to each scenario to identify conceptual level economic impacts for each project alternative.

The following economic benefits were observed for the Red Corridor alternatives:

- *Case R-1: Limited Access Freeway:* An informal comparison of the project cost of \$695 million for this alternative to the **upper range** of total project economic impacts (wages + output), which equals \$668.9 million, indicates that this project, even optimistically is marginal at best and more realistically could be expected to provide economic value that falls short of costs.
- *Case R-2: 4-Lane Divided Roadway:* An informal comparison of the project cost of \$150 million for this alternative to the **lower range** of total project economic impacts (wages + output), which equals \$863.5 million, indicates that this project, even using the pessimistic end of the range, appears to have the potential, in the long term, to produce economic impacts that out perform its costs.

The project analysis was also applied to determine the economic benefits for two Blue Corridor alternatives. As with the previous analysis, Case B-1 is a limited-access freeway and Case B-2 is a 4-lane divided roadway. The following economic benefits were observed for the Blue Corridor alternatives:

- *Case B-1: Limited Access Freeway:* An informal comparison of the project cost of \$770 million for this alternative to the **upper range** of total project economic impacts (wages + output), which equals \$647.4 million, indicates that this project could be expected to provide economic value that falls short of costs.
- *Case B-2: 4-Lane Divided Roadway:* An informal comparison of the project cost of \$165 million for this alternative to the **lower range** of total project economic impacts (wages + output), which equals \$915.9 million, indicates that this project, even using the pessimistic end of the range, appears to have the potential, in the long term, to produce economic impacts that out perform its costs.

As with the first two alignments, the project analysis was applied to determine the economic benefits for two Green Corridor alternatives. Case G-1 is a limited-access freeway and Case G-2 is a 4-lane divided roadway. The following economic benefits were observed for the Green Corridor alternatives:

- *Case G-1: Limited-Access Freeway:* An informal comparison of the project cost of \$ 780 million for this alternative to the **upper range** of total project economic impacts (wages + output), which equals \$ 678.2 million, indicates that this project could be expected to provide economic value that falls short of costs.

- *Case G-2: 4-Lane Divided Roadway:* An informal comparison of the project cost of \$180 million for this alternative to the **lower range** of total project economic impacts (wages + output), which equals \$988.2 million, indicates that this project, even using the pessimistic end of the range, appears to have the potential, in the long term, to produce economic impacts that out perform its costs.

Summary and Recommendations

This alternative evaluation process utilized extensive quantitative data developed for each final alternative corridor as a basis for decision-making. In all, a total of 24 separate criteria were used to evaluate each alternative and select the preferred corridor. The preferred corridor was selected because it represents an alternative that meets engineering objectives of feasibility, provides the best solution for existing and future traffic and safety needs, and minimizes disruption to the human and natural environment. The Lubbock Outer Route is recommended as a future transportation facility that will meet the future anticipated transportation needs in the region. Many portions of the study area have experienced dramatic growth in recent years and are projected to continue their expansion in future decades. This advancing trend in development must be met with advanced transportation planning in order to set aside and preserve a corridor for future transportation use. Preservation of the Lubbock Outer Route corridor will facilitate the establishment of a protected corridor that will minimize future disruption of the human and natural environment and will minimize costs associated with land acquisition and construction of the future facility.

The Conclusions and Recommendations resulting from the Lubbock Outer Route Feasibility Study are as follows:

- The preferred corridor is the Red Corridor. This corridor was selected because it best represents an alternative that meets engineering objectives of feasibility, provides the best solution for existing and future traffic and safety needs, and minimizes disruption to the human and natural environment.
- Further evaluation of the Red and Blue Corridors at the Route Study level is recommended. Although the Red Corridor was selected as the preferred corridor, the Blue Corridor was ranked second and was also deemed feasible. Since the preliminary 0.5 mile wide alternative corridors will be refined and narrowed in the Route Study to a 400-foot wide final route alternative, it is possible that an alignment within the Blue Corridor could be the preferred final alignment.
- Elimination of the Green Corridor alternative from further evaluation is recommended. The Green Corridor was a distant third in ranking and was not deemed to be feasible. However, due to concerns from the Wolfforth City Council about the impacts of the red and blue routes on Wolfforth's western expansion, the portion of the Green Corridor adjacent to Wolfforth should be further evaluated in the route study.

- Based on the Economic Impact Analysis, the proposed Lubbock Outer Route is feasible as a 4-lane divided highway in 2030. This could either be a conventional 4-lane divided highway or 4-lane divided highway with a median wide enough to accommodate a future freeway.
- The proposed Lubbock Outer Route is marginally feasible as a freeway in 2050. Since it often takes 20 years or more to get from the feasibility study to the construction of a major new location highway facility, traffic projections were also run for a freeway section in 2050.
- The preferred facility type is the interim freeway. This option will provide the 4-lane divided highway that is needed in the design year of 2030 and will also preserve the right-of-way needed for a future freeway. The advancing trend in development must be met with advanced transportation planning in order to set aside and preserve a corridor for future transportation use. Preservation of the Lubbock Outer Route corridor will facilitate the establishment of a protected corridor that will minimize future disruption of the human and natural environment and will minimize costs associated with land acquisition and construction of the ultimate future facility.

